The Antique Radio Gazette

OFFICIAL PUBLICATION OF THE ANTIQUE RADIO CLUB OF AMERICA

VOL. 15 SUMMER No. 2

Big Brother, Little Brother

See Page 13

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It is our intention to have the Gazette published as closely as possible to the following dates:

March 31 — June 30
September 30 — December 30

The closing dates for receiving material of all kinds in order to have it appear in the next issue would be:

February 15 — May 15
August 15 — November 15

The Antique Radio Gazette is published quarterly in Madison, Connecticut.

Yearly dues of $12.00 U.S. currency are payable to ARCA January 1, of each year for members in the USA, Canada, and Mexico. Overseas dues are $14, which includes airmail postage.

The Antique Radio Club of America was incorporated in the State of Kentucky, in September, 1972. The first meeting was held at the Marriott Motor Inn, Washington, D.C., on September 23, 1972. At this meeting, by-laws were read and approved and directors selected. We feel that the inceptionof this Club is a giant step in bringing together those indivuduals whose chief interest lies in the area of early radio. We invite all collectors and historians of the subject to join the Club. A note to William E. Denk, Secretary, 81 Steeplechase Road, Devon, Pennsylvania 19333, will bring you an application blank by return mail.

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President's Page

At the time this is being written, the 1987 Convention has not been held, but by the time you read this, the Convention will be over. All indications are that it will be the largest and best ARCA Convention ever held. Again, we must all thank our host, Joe Koesler, and the dynamic Mid Atlantic Antique Radio Club (MAARC) for their hard work, both before and during the convention.

The ARCA Club Secretary and Treasurer, Jane and Bill Denk, reported that membership is almost up to 900; that is, if everyone pays his 1987 dues. Past history shows that we lose some members every year. However, gains have consistently exceeded losses, so we continue to grow. Lloyd McIntyre, who was elected as your new president at the Annual Meeting on June 12, says that one of his main goals will be to reinstate dropped members, to further increase our positive growth. Maybe we'll be at 1000 by this time next year!

Since there was only one nominee per office, I think it safe to report that the new officers elected at the Annual Meeting are:

President	Lloyd McIntyre
Executive VP	Rod Phillips
VP	John Terrey
Secretary/Treasurer	Jane & Bill Denk
Recording Secretary	Ed Lyon

How did you like the 15th Anniversary issue of the Gazette? Thanks to John and Ruth Drake, and all of the authors who responded to my personal requests for articles, we proved that it is possible to have a great Gazette! The bad news is that it cost a lot more than the usual issue to print and mail. Therefore, we must revert to the size Gazette that our total income will support. You can count on seeing the Gazette grow as membership grows! As I've said before, if only a fraction of our members signed up one new member, we could increase our membership significantly, and significantly increase the club services to the members. It's really not hard. I've signed up dozens of new members myself, and I'm not much of a salesman!

The 1988 Convention will be held in Charleston, WV, June 8—11. It will be sponsored by the Charleston, WV ARCA Area Chapter (Region 3).

One of the major problems we have had in recent years at the Convention is the Bus Tour. We consistently lose money, about $300 in 1986, because of insufficient interest and attendance to cover the bus costs and tour director. However, attendee spouses do like to tour. For this year, therefore, we decided to try something new—"pay as you go" tours, led by club members. However, at this writing, it is not clear whether we will have any tours in Washington due to the lack of volunteer guides. The reasons are numerous, including fear about lack of liability insurance, apprehension that attendees won't like the tour, etc. I hope that it turned out that there were one or more tours, but even so, it is a major convention planning problem every year. So, if any of you members have any new ideas, and/or would like to help plan the 1988 tours, let Lloyd McIntyre know of your interest and willingness to help.

Thanks for all the help so many of you gave me during my several years as president. It has been fun. Please give your support to Lloyd. I know he will do a good job of leading the Club—but he will need the help and encouragement of everyone.

Jim

OUR NEWEST MEMBERS

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Hwang Nam Chang, Newark, NJ

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Robert Molesworth, New Britain, PA

Reinstate:

Zane Parsons, Kenova, WV

BOOK REVIEW
Radio Horn Speaker Encyclopedia
by Floyd A. Paul

Floyd Paul's new book is to loudspeakers what Morgan McMahon's VINTAGE RADIO is to early radio. It will establish itself as the sorely-needed "bible" of horn-type loud speakers for the period 1920 to 1927.

On page 39, Chapter Four (a 35-page picture encyclopedia of some 140 speakers), this reviewer found a horn speaker that he used with a Crosley 52, as a boy, in 1927. It was manufactured by Grigsby-Grunow-Hinds. The horn was of black, flexible Pyralin plastic, as I recall it. (Why did my parents toss it out when the AC-operated sets appeared?) On page 57 is an odd, square-cross-section horn speaker made by Trinity Radio Company, one of which I have in my collection, but have never before seen in a book. The illustrations – there are from one to six on 8 1/2 x 11-inch pages—are of excellent quality. On page 43 is the driverless King Am-Pli-Tone horn. This was for folks who had headphones and wanted to keep costs down. Just clamp the phones on the double air column that merged into one at the base, and "voila"!

Chapter 1, "In the Beginning" deals with the early development of horn

speakers, and describes the principal types of drivers. Chapter 2 (13 pages) discusses the ten leading manufacturers. Included are such companies as Amplion, Atwater Kent (that section written in collaboration with Ralph Williams), Magnavox, Timmons, and Nathaniel Baldwin. Baldwin not only made speakers under its own name, but also supplied drivers to a dozen or so other speaker producers. Chapter 5 presents a list of speaker manufacturers and trade names appearing on their products–arranged alphabetically by trade name; and Chapter 6 is similar, but alphabetically by manufacturer. A statement on the book's back cover indicates that it lists every significant speaker made in the 1920's. Clearly, this book, by an ARCA member, is a "must" acquisition for the collector and historian.

The book is available from: ARCA Book Store, ARCA West Virginia Chapter, 4204 Thorn Apple Lane, Charleston, WV 25312. Enclose a check for $11.95 plus $1.00 for postage.

Reviewed by Bill Denk

ROTTEN RECTIFIERS
by Bill Hurni W3HWT

Who knows what would possess a grown man to interrupt a calm and tranquil life of cutting the lawn, taking out the garbage and cleaning kitty's litter box to take up experimenting with chemical rectifiers, but be that as it may, that is exactly what happened. Now, I am not usually taken to flights of fancy, but I had this dream of banks of jelly jars, strips of lead and aluminum and saturated borax solution. Well, I could just see those babies with that blue green glow as I hit the key; ah, those good old days and other such delusions.

Now there are a lot of ways of turning a Hartley with a raspy and raucous RAC sound reminiscent of a flivver at fifty paces, into a pure DC note and wouldn't you know, I would pick the absolutely worst way possible. A nice pair of 216's? No siree; a motor generator? only sissies and weaklings would ever consider such a course. It had to be that bane of hamdom, the chemical rectifier. Now chemical rectifiers are just like women. They come in all different sizes and configurations, they will work with anything from a baking soda solution to latrine water, but if you don't pay constant attention to em, they'll up and make your life as miserable as it can be. The one thing that you can say about a slop jar setup that's printable is that they are cheap, or should I say, were cheap, and after using the house money for that new UV203, corners had to be cut somewhere. Now some of our fraternity just cut the corner right off and took the juice right off the high voltage side of the old Acme, but most, with a nod to civility and not a little chiding from ARRL and our friends in Washington, chose to polish up their signals a bit before forcing them onto the ears of their fellow amateurs. Now the cost of a motor generator was enough to make a grown man cry, so you can imagine what it would do to a young lad just new at the game. Needless to say, he quickly found his way to his mother's jelly jars and Twenty Mule Team borax. After all, she most likely wouldn't even notice that two-thirds of her jars were missing and lead and aluminum were readily available, but woe be tide to the young squirt who did not procure pure aluminum. Why, the tales of misfortune surrounding such a mistake are enough to fill a book especially since they were described at great length. The results, however, took one of two paths, either the darn thing would not pass current or it would get hot enough to heat the shack on a cold winter's night. With all this forewarning, you can imagine that I took great care to locate the absolutely purest aluminum I could find in my junk box down in the basement. Thus I ruled out a sheet with paint on it. I was about ready to use this piece that had a

whitish ooze on it, but fortunately at the last minute I discovered what appeared to be a piece about 1/16 inch thick and reasonably clean so I took that, cutting it into strips 4 and 9/16 inches long and 1 inch wide. Believe it or not, I also had some 1/32 inch sheet lead in the junk box which I cut into strips 3 and 9/16 inches long and one inch wide. The Aluminum industry was quite young in the twenties and the smelting process not as refined as today. For this reason, I felt a cause for optimism that garden variety soft aluminum would be adequate. If not, I could always use the rectifier bank as a heater in the bathroom which would be a welcome addition on a cold winter's morning.

Always with an eye toward hanging onto my amateur license, I decided it would be prudent to build a low power unit which would supply high voltage to a UV210 Hartley transmitter. This way, if the lash up sounded too bad, nobody would hear me anyway so it would make no difference. If the infernal thing actually worked, so much the better.

The Old Man has warned numerous times on numerous occasions using numerous invocations of the powers above not to exceed 40 volts per jar. So having great respect for the old gentleman, I included 10 jars in each leg of a full wave setup which would provide 350 volts for the plate of the UV210. Another similarly exhorted rule states that one should provide one square inch of area for each 50 milliamperes of current. The setup as described should provide 1.5 square inches of electrode surface, adequate for my low power rig, especially operating CW only.

If I may be given the luxury of digressing for a moment. You might wonder why so much pen and paper was put to the cause of convincing the wayward ham of the virtue of 40 volts per jar and no more. The reason becomes apparent if one takes the next step above and entry level rig. Consider a KW transmitter running 2000 volts on the plates. That translates into 50 jars per leg in a full wave setup. Why, you need a whole bench and a big one at that just to house the rectifier, plus a few hundred shares of stock in a jelly jar company wouldn't hurt! You can see why any prophet espousing 200 volts per jar would be followed and there were many of them.

Well, now to the jars themselves. Jelly jars went out with button shoes, especially 20 jelly jars all the same. You have to eat an awful lot of peanut butter and jelly sandwiches to accumulate those 20 jars. However, large baby food jars are just the ticket and the way kids eat, you can collect 20 jars in a matter of several weeks—all the same size and shape, too. They have a capacity of about 200 ml, just right for a low power hook up.

Some kind of tray or box will be required to hold the jars and keep them from moving around. The darn things are restless you know, especially when you don't want them to move. The tray will also help in the futile attempt to contain any spills and/or crystalized borax which seems to accumulate on everything. I made mine out of 1/4 inch oak, but one need not be that fancy. Wood from an old orange crate would be just fine and about as easy to find as 20 jelly jars. A coat or two of varnish protects the box from the chemical onslaught. You really can't appreciate how important the containment is until you have actually lived with one of these beasts for a time. Each jar acts like a little reflux apparatus when in operation. Slowly, the borax starts creeping up the sides of the jars, then over the top and so it goes. Before you know it, it's everywhere.

Now, back to the electrodes again. If my advice is taken and the quest for orange crates and jelly jars is dropped and the large baby food jars substituted, then the electrode strips should be bent in the following manner. If you insist on going your own way, then the length of the strips and the following information is out the window. Bend the aluminum strips into the form of an L with the long dimension being 3 inches. Do the same

for the lead strips. The short leg of the L for both the lead and aluminum pieces is overlapped tightly and a hole drilled through the two of them. The two pieces, one lead and one aluminum are bolted together with a 6 32 X 1/4 brass machine nut and bolt. The resulting U shaped electrode will straddle two large baby food jars that are side by side. In this fashion, a chain of jars is constructed. Two chains of ten jars each was laid out side by side in the tray with a wooden divider between them for the two legs of a full wave circuit. I mounted the two sets of end electrodes on pieces of bakelite mounted to wooden posts, glued to the ends of the tray holding the jars. With all the pieces gathered together, it is only necessary to assemble the unit (Fig. 1). Make certain that the baby food jars as well as the electrodes are clean. A strong detergent wash, followed by rinsing and drying should be adequate.

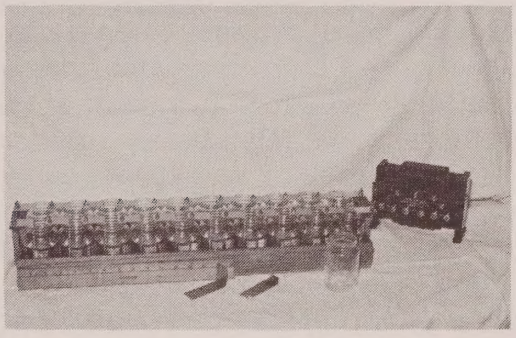


Figure 1 The chemical rectifier bank with an Acme 200 watt CW transformer.

Now, this cleaning business was considered very important back in the old days and great warnings issued from texts on the subject. As you can well imagine, chemical rectifiers were a popular subject of cocktail party conversation, but be that as it may, about as much time was devoted to the subject of cleaning the electrodes and jars as was devoted to the number of jelly jars required for the leg of a rectifier circuit. Hot lye was the weapon of choice back then and great care was advocated in using it so as not to turn all the utensils within a ten foot radius of the stove black, not to mention the lungs of the budding amateur. I chose a modern detergent as a safer alternative.

Many different chemicals can be used as the electrolyte. However, I chose the old standard, Borax. The chemical name is sodium borate ($Na_2 B_4 O_7 10 H_2 0$). Using 150 ml of saturated borax solution in each jar will require 3 liters of this solution. To 3.1 liters of distilled water, add 250 grams of sodium borate, heat and stir until boiling. Distilled water is a must here. It can typically be obtained at your local supermarket. The borax will go into solution as the water heats up. This should ideally be done in a glass vessel to avoid contaminating the solution with impurities from a metallic container. When the borax is completely in solution, allow it to cool to about 75 degrees C then pour it into a clean 1 gallon plastic milk container or some other suitable vessel and allow it to cool undisturbed overnight. You will find that upon sitting, some of the borax will precipitate out of solution. This is expected. The result will be a saturated borax solution which can then be added to the baby food jars. Make a mark on each jar corresponding to 150 ml then add solution to that point. The mark will provide a handy reference for adding more distilled water to compensate for evaporation.

The current will flow from the lead to the aluminum, so hook the two ends with the aluminum electrodes together and connect the two lead electrodes to the high voltage winding of your transformer. Keep the old Acme CW transformer in reserve and do the required forming of the electrodes and testing with an old TV transformer. You know, it gets so you really begin to appreciate those solid state diodes. But wait, it gets better; the forming doesn't last too long and if you get a touch of the gout or the XYL lays down the law and won't let you pound brass for a couple of weeks, you have to form the rectifiers again and don't forget to add some distilled water!

If you apply full power to an unformed chemical rectifier bank, the darn thing will look like a dead short and the whole shootin' match will go up in smoke, that is the transformer, the rectifier bank and maybe even the shack, so connect a variac up to that TV transformer and raise the voltage slowly with frequent stops to let the aluminum electrodes form. A good way to monitor this event is to place an AC voltmeter across one leg of the high voltage winding of the power transformer and a DC voltmeter between the output of the rectifier and the transformer center tap. Don't let the difference between the two get greater than 100 volts before stopping and allowing the output voltmeter to catch up to the input voltmeter. The whole process shouldn't take more than about 15 minutes. Now you can hook up the Acme and a brute force filter.

I use an American Transformer Co. choke which looks to be about 15 henry and a 2 mfd paper capacitor on either side. Check those old capacitors to make sure they are not too leaky before putting them in place. A little leakage isn't bad as it provides for a substitute bleeder resistor! These early hams weren't fancy, they didn't use a chassis or anything like that for a power supply, or even the transmitter for that matter. The components were just laid out on the bench and wired up which is exactly the lash up I used.

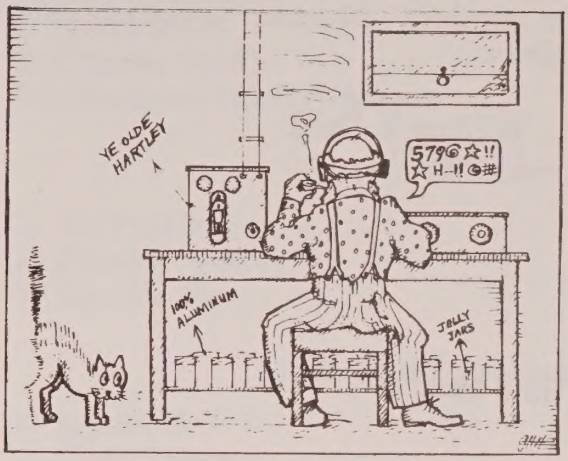
Now I didn't go through all this bother with jelly jars and borax just to occupy my spare time, of which I have little, or to avoid the cost of a couple of diodes. No, I wanted to get into this amateur radio game as it was practiced by those ancient wizards of the air waves. Well, you can imagine my shock when I found out that as far as chemical rectifiers were concerned, none of these boiled old owls knew what they were doing. Maybe they weren't sure what they were doing half the time, but they had no idea why they were doing it! Why, I wore out the edges of my prized collections of QSTs, various handbooks and other technical tomes and kitty suffered unspeakable abuse, looking for an explanation as to exactly how the infernal bottles converted AC to DC. Sobered by this experience, I began to search through old chemistry books and other sources of wisdom looking for the answer. From isolated facts and observation of my own rectifier bank, I have pieced together a story which goes farther than anything I have seen in the literature, but is still incomplete. My conclusion is that no explanation was put forth because no one knew how the confounded things worked. Chemical rectifiers were confined to the amateur fraternity and therefore most likely received little scientific study. They died a swift and quiet death with the advent of cheap vacuum tube rectifiers.

After forming, if one inspects an individual jar during operation, one can observe that a gas is evolving from the aluminum electrode. This gas, I believe, is hydrogen produced by the electrolysis of water. I believe that aluminum hydroxide, not aluminum oxide is a by-product of this hydrolysis and it is the insulating layer which is formed at the aluminum plate. The borax solution does not chemically participate in the reaction but provides a conductive medium as many ionic solutions will function in its place. A chocolate brown coating which I believe to be lead oxide, forms on the lead electrode. No gas evolves from this electrode during operation. The lead electrode appears to be inert in that it does not participate in the rectifying effect. The lead hydroxide is perhaps acting as a semi-conductor.

In operation, drawing 100 ma, I observed a voltage drop of 100 volts across the chemical rectifier bank and 50 volts across the filter network. The output of the power supply was 400 volts at 100 ma of current.

Darn if that thing isn't a fine sight sittin' in the shack with that phosphorescent glow on the aluminum electrodes when the lights are out along with the white hot glow of the UV210. Why, it's enough to make you wish for

those good old days again.



My first contact with this set up was with a station in Maine. Now I won't give his call because I swear he must have had a tin ear as he gave me a 579 report (the XYL probably had the Waring blender going in the next room). Now anyone who gives a 210 Hartley a 579, most decidedly needs a hearing aide at the minimum. After a little tuning and adjusting another young squirt was contacted out in Minnesota who gave me a 569. That just about took the chair out from underneath me. Then it hit me like a ton of bricks—these neophytes of the ether never heard a real TRANSMITTER before! I am sure they got all confused when they heard my beautiful note and in consternation just gave me what they give everybody else, a T9 report! I became reassured when a friend some 50 miles distant, who is noted for his critical ear, gave me a 587 report with noticeable chirp but no AC modulation. Success was mine!

TOM would just spit and probably set his beard on fire with the soldering copper if he knew that all my jars were not uniform. A few get just a little bit warm and there is a bit of fireworks on some of the electrodes (adds a patriotic touch) but darn if the thing doesn't work. Besides, he's gone to his reward along with all of this junk that we collectors keep hauling back from the grave. It's too bad we can't bring him back, too. A fine fellow and an interesting sort, at that.

For those of you who just can't get enough of this subject, what follows are several references so you can see for yourself how fanatical those early hams were when it came to chemical rectifiers.

1) Kruse, S. A Symposium On Aluminum Electrolytic Rectifier Operation, QST, Vol 5, June 1922, p20-25.

2) Mason, H.F. Making the Five Watt Set Work, Qst, Vol 8, October, 1924, p52-56.

3) Handy, F.E. and Hull, R.A. The Radio Amateur's Handbook, 4th edition, 1928, p106-108.

PHILCO MODEL 90B – SECOND REINCARNATION

Collectors of the once-popular cathedral-style radios may recall that, in 1972, PHILCO-FORD manufactured a two-thirds scale reproduction of PHILCO's 1931 Model 90B "Baby Grand," as it was then known. PHILCO's Model 70B was of generally similar appearance. PHILCO-FORD's 1972 scale model had a plastic (rather than wood) cabinet. The radio inside was 1972 state-of-the-art P. W. board construction, offering both AM and FM reception. Its price was $49.95, which was the price of PHILCO's first cathedral sets.

An interesting Chinese copy of that 1972 PHILCO has recently appeared under the trade name THOMAS. It is manufactured in Hong Kong. This time, however, the cabinet is wood—not plastic! The writer has one of the 1972 PHILCOs, and recently acquired one of the current THOMAS models. Performance seems generally equivalent, and both sets have AFC on the FM band.

The THOMAS version is available from several sources, of which I am aware of two: Yield House, North Conway, NH 03860, price $99.00 plus shipping costs; and Vital Concepts, 925 Delaware Street, S.E., P. O. Box 14805,

Minneapolis, MN 55414-0805, price $89.99 plus $7.00 shipping. Yield House has retail outlets in a number of the northeastern states.

The dimensions of the THOMAS radio (like the PHILCO-FORD reproduction), 12 1/2"H x 8"D x 11 3/4"W, are such that it can be used on a bedside table as a clock radio, if combined with a modern 24-hour programmable timer.

William E. Denk
Devon, PA

ARCA CONTEST 1987

Judges:
Geoff Bourne, John Caperton, Orval Parker, Larry Williams, Ralph Williams

Class 1 Crystal Sets (4 entries)

1) Ralph Muchow—People's Award	German Submarine Receiver
2) Bob Lozier	Telefunken & Sign
3) John Myers	Sliding Condenser Home Brew

Class 2 Regenerators (5 entries)

1) Ralph Muchow	Grebe CR 3A
2) Mike Katzdorn	IP501 & Triode Amp
3) Emmett Smith	Masterphone
3) Walter Asherbraner	Grebe CR-5

Class 3 R.F. Amplifier Sets (8 entries)

1) Jerryl Sears	Western Electric 3A
2) Bob Lozier	Nora K3-WDL Italian
3) Larry Flegle	Silver Marshall and Sign
Robert Trauterman—Special Award	Freshman Masterpiece
Michael Prosise—Special Award	Philco 513 with Console
Emmett Smith—Special Award	Kodel with Speaker

Class 4b AC Superheterodynes (3 entries)

1) Joe Koester—Best in Show	Silvertone Grandfather Clock
2) Glenn Hartong	AK 627 Cathedral
3) Stan Watkins	Zenith 125 232

Class 4a DC Superheterodynes (1 entry)

1) Jerryl Sears	Mercury Super Ten

Class 5 Advertising (5 entries)

1) Don Hunter	Brandes Girl
2) Don Patterson	AK Antenna Lamp
3) Paul Corrette	AK Banner

Class 6 Speakers (5 entries)

1) Ralph Muchow	Sarnoff Horns
2) Jerryl Sears	Detroit Horn with Baldies
3) Charles Hinkle	Minilux Hervor
Jim Kreuzer—Special Award	AK Type E-3 with Box

Class 7a All American Fives Wood (6 entries)

1) Joe Koester	Delco Award
2) Charles Hinkle	Emerson with Case
3) Clay Seidel	Emerson AU 190

Class 7b All American Five Phenolic (6 entries)

1) Jim Rankin	Colonial N
2) Glen Hartong	International Kadette
3) Joe Koester	Wards Rudolph
3) Bob Lozier	Airking

Class 7c All American Five Glass & Mirror (2 entries)

1) Charles Hinkle	Radio Glo
2) Joe Koester	Algene Snakeskin

Class 8 Tubes (1 entry)

1) Don Patterson	Sodion Collection

Class 9 Books (5 entries)

1) Jim & Felicia Kreuzer	Hertz Collection
2) Don Hunter	Wireless Institute B.H. Clark
3) Jerry Simkin	Gernsback Course

Class 10 Test Equipment (1 entry)

1) John Glisson	Supreme AAA-1

Class 11 Consoles (3 entries)

1) Stan Watkins	Zenith 7S 261
2) Joe Koester	Zenith 15W 269

Class 12 Television (2 entries)

1) Craig Roberts	Scott Projection

Class 13 Transistors (2 entries)

1) Bob Lozier	Raytheon T2500
2) Bob Scheps	Emerson 888

Total entries—59

RESTORATIONS

Now and then those of us who enjoy building odd-ball sets, experimenting, servicing, and bringing clunkers back to life, run into problems that drive you up the wall!

You hit a point when nothing makes sense! Frustrated, you sit back—or walk away for awhile—while the old brain sorts out all the possibilities of what's wrong.

Recently the writer assembled an Atwater Kent model nine from components on a beautiful Di Barry replica AK board. On completion, all wired up, it was an item of beauty! Hook up the power supply—and inserting the tubes—flip the switch in anticipation. The result—nothing! Just a slight buzz—no stations evident.

Wiring re-check—all OK? Solder joints—OK? Another set of test tubes—same problem? Flip on the meter and start from the antenna post—going from point to point. Continuity OK? Shorts? Off comes the antenna coil—wire leads inside the coil form going through the board—alignment? Coil wire leads through tiny holes with a glob of solder to insure continuity, but wait! What's the meter showing? High resistance there. Problem solved! Fire off—again—No soap!!!

Touch the antenna wire to grid of tube unit and out comes a stacatto machine blast! Audio transformers OK. Could it be the grid condenser? But checked OK. Press on the detector tube in the socket—just some scratchy noise. Out come the tubes. The phospher bronze spring contacts have been scraped, but look brown. Reaching for my Dremmel fine grinder tool—I went into polishing all those bronze contacts until they gleamed! Likewise—tube pins. In the meantime my B power supply decided to give up the ghost. I quickly substituted another.

Finally, another fire-off. This time with ear-phones on my head. WPEN came blasting forth—making my hair stand on end!!

The moral of this story—Never trust switch contacts, or socket springs until they are PERFECTLY clean!!! The same applies to a lump solder joint crowded into a restricted place. It may look good but be aware!! Clean—clean—and be sure of all contacts. Sprays may help but they often times are not the final answer. Just a few ohms of resistance sometimes make the difference of good performance—and just the mediocre.

Cheerio!!

Dear Mel,

Being a member of A.R.C.A., I would appreciate some help with information on an early portable radio, that I recently came across.

It hasn't a manufacturer's name or model number on it. However, the following items are interesting to note:

1. It has a station indicator that goes 00-100.
2. The gang condenser mounts on top of the station indicator. The whole gang condenser is only 1/4" wide.
3. Volume control and switch is a flat slider.
4. Uses 1-6F7 & 1-12A7 tube.
5. Measures 5 1/2" x 3 1/2" x 2".
6. What really caught my eye is that it uses a 3" speaker with a horseshoe magnet in the front of the diaphram, not the rear.

Thomas Romano
31 Granby Road
Worcester, Mass. 01601

Call Collect: 0-617-797-5753 nights
0-617-354-9972 days

Old-timer's Notebook

James A. Fred © 1986 J. Fred –

Dear Radio Collector:

For the past two years I've been asking you to send your questions about radio repairs. Now I am turning the table on you and I am asking you a question.

Q. Where can I get a list of the private brand radio factories, in Chicago, that identified themselves by code numbers, i.e., Plant "A" Chicago. At one time, about 1930 to 1937, there were over thirty-five brand names of radios being made by a handful of small factories in Chicago. These names had no connection with the factories that produced them. There was a label on the back of the metal chassis with a long list of RCA and Hazeltine patents (under which) the radios were made. There was no factory name—just Plant "A" through a number of the letters of the alphabet. I would like to compile a list of these factories with their identification code letter. If you have such a list write to me: Jim Fred, R 1, Box 41, Cutler, IN 46920.

Dear Old Timer::

Q. I have a Philco radio model 89. The tuning capacitor wobbles all over the place. There is the remains of some kind of bushings around the capacitor mounting screws. How do I firm up the mountings and mechanically stabilize the capacitor?

A. When the radio was built, it was standard practice to isolate the capacitor from the chassis. Usually live rubber grommets were used to mechanically and electrically insulate the capacitor from the chassis. Sometimes there were also phenolic insulating washers.

They were electrically insulated because the capacitor frame was usually connected to the AVC return line. Some engineers preferred to ground the capacitor frame. The reason the capacitor was mechanically isolated from the chassis was because of vibration. Many sets had the speaker mounted on the chassis and vibration could be a problem. A tiny bit of movement of the capacitor plates would change the frequency setting and distort the radio's sound.

To install new rubber grommets, you must unsolder all the wires connected to the tuning capacitor. You will also need to unstring the dial cord. Be sure and draw a picture of how the dial cord was arranged around the pulleys and tuning shaft. Live rubber grommets are a light straw color and are quite soft. They used to be available at any large radio parts' store, not Radio Shack. The grommets were distributed by G. C. Electronics, in Rockford, IL. If you can't find live rubber grommets, then you can use the black vinyl or rubber kind. They are better than nothing.

Q. I have accumulated around 40 old grid leaks, but they all test "Open" with my ohmmeter. What is wrong?

A. Unless you are using the ohmmeter scale of a VTVM, your meter may not have a high enough resistance measuring capability. Most of the Japanese variety of AOM do not measure reliably above 100,000 ohms. Most grid leaks were originally from 250,000 to 5,000,000 ohms, i.e., from 1/4 to 5 megohms. A VTVM ohmmeter will usually read to 100 megohms.

We will assume that you are using a VTVM ohmmeter and the grid leak is open. I've found a way to restore open grid leaks that works about 50% of the

time. If I can't restore it, I put a new resistor into the glass tube of the old one.

Grid leaks normally consist of four parts, i.e., 2 brass end caps, a glass tube, and a resistive element. There are several ways to make the resistive element. There are carbon rods much like the lead from a wooden pencil. However, most of the ones I've restored had a piece of cloth, much like a shoestring, that has been saturated with a resistive paint, with a brass clip at each end. Most of the elements I've checked were still good, but there was no continuity with the end caps. The end caps are filled with "Woods metal" which is an alloy of lead, tin, and bismuth. This alloy is available in Hobby Shops and supply houses under the brand name "Cerro Alloy." It melts at temperatures from 158 to 281 degrees F. It usually expands when it cools.

To repair a grid leak follow these easy steps.

1. Hold one end cap against a heated electric hot plate. The woods metal will melt, leave the end cap on the hot plate.

2. Turn the grid leak end for end and melt the other end. Remove the resistive element and measure its resistance. If the brass clip is tarnished, sandpaper both clips until they are bright and shiny.

3. Insert the element into the glass tube and insert the tube and element end into the molten woods metal in one endcap. Grasp the end cap with long nose pliers and while pushing on the open end of the tube with your other hand, remove the assembly from the hotplate. Hold firmly until the woods metal gets cold.

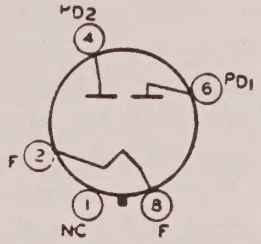
4. Repeat with the other end of the tube and element pushed into the other end cap. As the metal cools it will expand and hold the tube and element inside the end cap.

About 80% of the more than 30 old grid leaks I did responded to this treatment and measured like new again.

For the grid leaks you can't repair this way, you can insert a 1/2 watt, 2 to 5 megohm resistor into the glass tube and end caps. Since most old grid leaks have paper labels, you won't be able to see the resistor inside.

Q. I have a Philco radio that requires a 5Y4-G rectifier tube. I've tried everywhere, but I cannot find a 5Y4-G tube. There are plenty of 80's and 5Y3's, but neither will perform as a plug-in replacement. What am I to do?

A. While a 5Y3 is the electrical equivalent of the 5Y4, the elements in the glass envelope are connected to different pins in the base. The 5Y3 has filaments connected to pins 2 and 8. The 5Y4 has filaments connected to pins 7 and 8. The 5Y3 has two plates connected to pins 4 and 6. The 5Y4 has two plates connected to pins 3 and 5. There is at least four ways to overcome this problem. First, take the chassis out of the cabinet and rewire the socket for the 5Y3. The two base diagrams are shown. If this is your solution, be sure and make a note on the tube layout drawing.

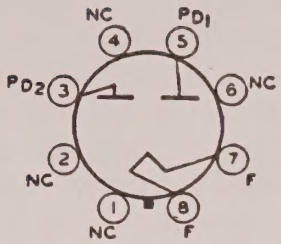


FULL-WAVE VACUUM RECTIFIER

Glass octal types used in power supply of radio equipment having moderate dc requirements. Type 5Y3-G, Outline 42; type 5Y3-GT, Outline 25, OUTLINES SECTION.

5Y3-G
5Y3-GT

Second, If there are enough tube pins, connect the proper pins with bus wire. See the diagram. This idea won't work if the tube manufacturer has left some of the pins out of the base, or if he has used



FULL-WAVE VACUUM RECTIFIER

Glass octal types used in power supplies of radio equipment having moderate DC requirements. Outlines 42 and 45 respectively, OUTLINES SECTION. Tubes require octal socket. Type 5Y4-GT is supplied with pins 4 and 6 missing.

5Y4-G
5Y4-GT

These two diagrams clearly show the difference in the base connections of the 5Y3G and the 5Y4G.

some of the socket terminals as tie points for the other components.

Third, You can make an adapter to go between the 5Y3 tube and the 5Y4 socket. One problem you might have in a table model is the one inch extra height this adds to the tube. The set may not go back into the cabinet.

Fourth, remove the base from the 5Y3 tube. When you put the base back on the 5Y3 tube, you solder the element wires to the proper pins for a 5Y4. You then cement a label on the tube base showing that the tube is now a 5Y4. I use black RTV Silicone Rubber Auto Seal to cement the base to the glass bulb of the tube. I buy the Auto Seal in the automotive department of a K-MART store.

Keep the cards and letters coming. I need your questions for future columns.

ATWATER KENT LOUD SPEAKERS

by Ralph Williams

The first two decades of radio were so different from today's broadcasting that the average listener would not recognize those beginnings. Even the name, radio, had not become common since the new art still retained an earlier identity: wireless had simply discarded the wires. The interface between humans and wireless equipment was direct; neither the careful gathering of audible sound for transmission, nor the production of large amounts of acoustic output was required. The telegraph key and the telephone receiver provided effective interfaces with a wireless link.

The advent of broadcasting drastically changed the way that humans interacted with radio, not only in purpose but technically as well. The input to a broadcasting link became a complex of sounds ranging from a single voice to a full orchestra. The output from the radio broadcast receiver had to be a reproduction of the input that could be made acoustically available in every conceivable human habitation. Earlier devices were applied to achieve these extended demands. At the input, the telephone transmitter grew into a microphone and provided the direct interface. At the output, the earphone metamorphosed into the necessary loud speaker.

When Atwater Kent entered the radio business, broadcasting had already established its purpose and its power. Much of the technology had been conceived but little had been converted to reliable products for the user. The development of the loud speaker became a significant part of Atwater Kent's engineering and manufacturing activity. His line of reproducers provides an interesting opportunity to look at one aspect of the growth of radio broadcasting from its first popularization to its maturity in the middle 1930s.

The first loud speakers that anyone made were little more than earphones hitched to horn-shaped acoustic couplers. A notable exception was Magnavox whose reproducer was voice coil driven. Atwater Kent's entry to the radio market was, like the general product, a horn driven by an upgraded earphone-style reproducer.

Radio historians are also interested in the backgrounds of the makers of radio equipment. Most are well aware of Atwater Kent's history in the automobile electrical equipment business, especially for his contribution to internal combustion engine ignition. Perhaps Kent's earlier experience in the field of electro-acoustics is not as well known, but of some interest, especially in relation to loud speaker production. Not long after Atwater Kent started manufacturing electrical products in Philadelphia (at about the turn of the century), he brought out two acoustic devices, both named Monoplex. One was a horn intended for automobile or boat warning use. It was a motor-driven (vibrator) diaphragm that was, in later times, commonly called an "oo-gah" horn, figure 1.

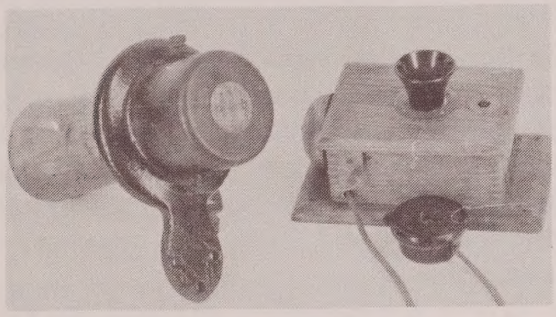


Figure 1

The second device was a telephone consisting of a transmitter and a calling bell with switch, contained in a small oak box. For listening the telephone used a small earphone which was hung up on a hook switch on the side of the box. The earphone was the granddaddy of Atwater Kent's first radio loud speakers. Its design was primative but closely related to the Atwater Kent volt-ammeter of which it was a contemporary. The earphone was made of cast iron in the watch-case style with a steel diaphragm and a hard rubber cap. The magnet shape was two generations away from Kent's first loud speaker because the case was part of the magnetic path. The path was completed by means of a center post around which a coil was jumble-wound. The case-and-post structure was magnetized so that it attracted (magnetically biased) the diaphragm. The field from the coil alternatively increased and decreased the attraction, thereby producing an acoustic analog of the electrical signal input. In its time the reproducer worked, but much improvement was needed for loud speaker applications.

The improvement came as the result of Atwater Kent's deep involvement in automobile ignition system development. The heart of all the common ignition systems in the first half of the twentieth century was a magnetic device (an inductor). Its purpose was to provide the very high voltage needed for the spark. Understanding the basic ideas involved in the ignition inductor: the coil, the magnetic circuit, the function of the air gaps, the charging current and the discharge voltage characteristics taught the Kent technicians much about magnetic devices including the basics of sound reproducers. The reconsideration of the earphone as the basis of a magnetically operated loud speaker was, therefore, more the application of experience than experiments to see what could be built.

Examination of the first of the family of loud speakers shows the increased sophistication of the Company's technical capability. The first loud speaker was the Model M, figure 2. The repro-

Figure 2

ducer unit used a two and one-half inch diaphragm vibrated by a pair of electro-magnets which were, in turn, secured to the pole pieces of a two-inch horse-shoe magnet. The magnetic circuit did not require the enclosure to complete its path as did the Monoplex earphone. The Model M loud speaker was introduced in mid 1923, followed shortly by two phonograph reproducer units. The Model M reproducer was assembled on a pot-metal casting but the phono units used a thermosetting phenolic (Bakelite) for the support structure. Most collectors regret the choice of pot-metal since stress corrosion has taken its toll over the years and even the M units no longer fit into their bases properly.

A production improvement characterized the rest of Atwater Kent's horns. The cast iron base on the Model M was replaced with a stamped steel base on the later loud speakers. These were Models L, H, G, and R. Model L was a little lower, Model H a little higher, Model G was gray-green in color and Model R was a runt, figure 2. It is hard to believe the model letters were chosen because of such associations but other reasons for the choices are not much better. More data and description may be found in an article by Floyd Paul and the author in "Old Timer's Bulletin" Volume 23 No. 3, Dec. 1982, pages 9-11.

Although loud speakers of the horn-style were offered as the proper reproducers for the breadboard series of receivers and the big Model 20, the quality of reproduction was well below the potential offered by the sets. The limitations were three-fold. First, the amount of low frequency coupling depended on the bell diameter and this cut efficient reproduction off just below 400 Hz. Second, the impedance of the coils was too low to properly load the last stage of the receiver and third, the sound power output depended on the diaphragm spacing from the pole pieces. This had to be large for large amounts of power but small for high sensitivity. Continuing adjustment of the reproducer was not the mark of a convenient product. A better way was sought.

The better method that was available was to use a large surface to move air while a small motor was used to convert the electrical signal to mechanical motion. Put differently, the diaphragm of the earlier units was divided into two parts: a large, light, air-moving surface and a small separate armature. The loud speaker that resulted was called Model K, figure 3. The air mover was a paper

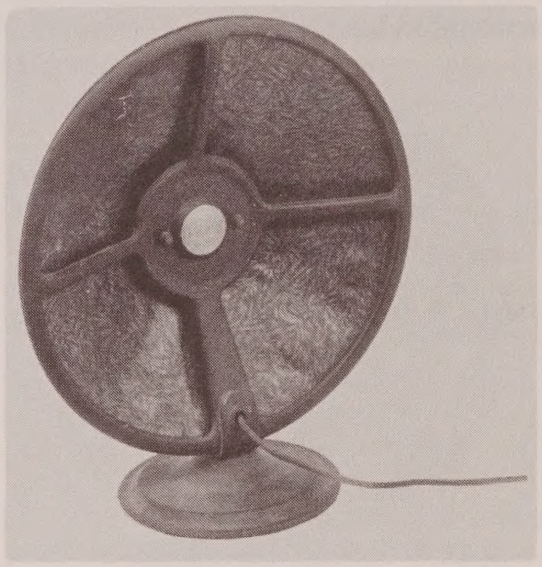


Figure 3

cone. The motor was a vibrating bar connected to the cone by means of a short post, which also supported the cone. The arrangement of the pole pieces was that of the earlier Model M driver but they were rotated 90 degrees and enclosed in a double horse-shoe magnet. The bar completed the magnetic circuit in a manner similar to the way the diaphagm had done earlier.

Model K was a poor performer. The problem was that the gap between the pole pieces and the bar opened and closed with motor action. Therefore, the armature (the bar) had to be tightly fastened at one end so as to limit deflection to no more than a few thousandths of an inch. The loud speaker, consequently, was not very loud. The next loud-speaker series solved that problem.

By rearranging the pole-pieces inside the double horse-shoe magnet, Atwater

Kent was able to place the armature between them, instead of using it to close the gap. The air part of the total magnetic path had to be increased to allow for the motion of the armature. Therefore the permanent magnets had to be strengthened, but the reluctance stayed much more constant. By increasing the number of turns, the impedance at low frequency was increased and the response was broadened and because the reluctance stayed constant, the distortion decreased. The loud speakers in

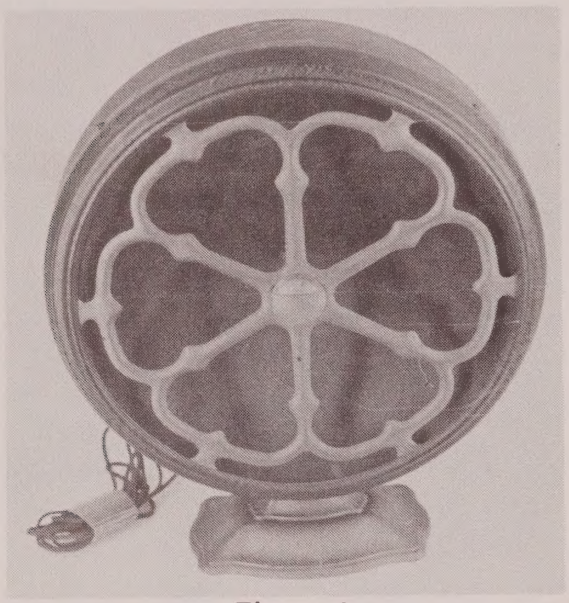


Figure 4

this series were designated Model E, figure 4.

The first Model E loud speaker used a free-edge cone about fourteen inches in diameter. The weight was supported by the center driving post. The outer periphery was softened by a felt- surround sewed to the paper. The felt touched the inside of the front grill very lightly. Because the motion required to give acceptable volume in an ordinary living room required cone movement of less than one one-hundredth of an inch, the edge of the cone touching the grill did not hurt the speaker's operation. A slightly smaller version of this speaker, designated Model E-2 was brought out at about the time of the Model 40 series of electric receivers.

Over the years since the Model E was new, the cones have warped and push the felt strip more forcibly against the grill. Even so, the speakers work quite well. The main difficulty (not a common fault) is that the vibrating armature touches one or the other of the pole pieces on high amplitude signals. The motor was equipped with two adjustment screws for recentering the armature support, one on either side of the unit. One screw acts to lock the adjustment by tightening against the support which is held in place by the other screw. Adjustment usually returns the speaker to its normal operation.

Atwater Kent's engineers recognized that with their pliability, the cones he was using could be lightly constrained around their edge without reducing the speaker performance. This improve-

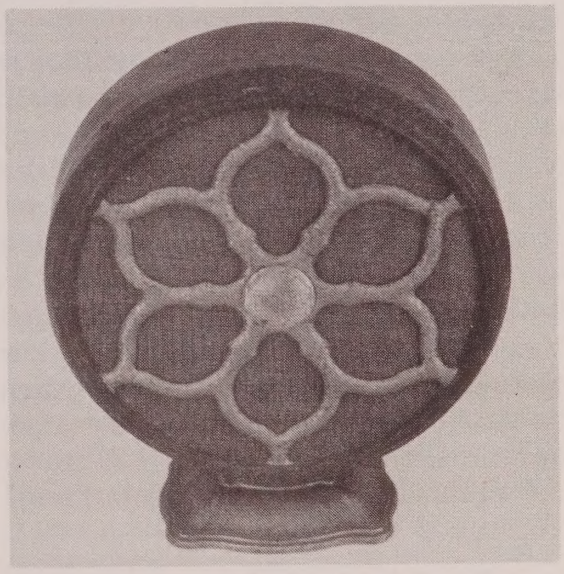


Figure 5

ment was the basis for the Model E-3 loud speakers, figure 5. On these speakers the felt-surround was replaced by a cardboard ring. The front grill of the metal case was lined around its inner edge with a felt strip which pressed the cardboard ring against the main metal frame.

To be continued in the next issue.

Ye Old SWAP SHOP

All ads and Swap Shop items are printed in the Gazette free of charge. We do ask that you write your ad on a separate sheet of paper, type if possible, or print, and be sure to include your name and address. We reserve the right to edit all ads. ARCA is not responsible for any transactions, of course

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FOR SALE/TRADE: DeForest D-12, orig. Grille, coils, with repro antenna—$350; DeForest D-17, leatherette, with coils, no antenna, fair cond.—$150. WANTED: DeForest D-7 or D-7A, DeFOrest detectors SP-1 thru SP-4; any Wallace or Arnold receivers. George Potter, 2069 Sienna Trail, Lewisville, TX 75067 (214)393-0020

WANTED: Good panel for Kennedy 220; also binding posts and cabinet. Have Kennedy V panel to trade, also many parts, sets, etc. What do you need? Have RCA store stock from late 20's thru 40's to sell or trade. Need Federal 61 cabinet. John A. O'Bannon, 426 W. Madison St., Paris, IL 61944 (217) 465-526

WANTED: Needles for Airline phonograph 1948 model. Also need speaker for AK 55-C. Dave Friedland, P.O. Box 89A, Frazier Park, CA 93225

FOR SALE: Atwater (1936(?), VG to EXC, works) $40 (black cloth with chrome trim; unusual design, simple but attractive); Clarion Jr. Model 320 (1933(?), good, untested (power cord frayed)) $65; Philmore Open Type Detector #310 (1930's-40's, unused in original box,) $10 (includes cat's whisker & xtal mounted on a fiber board with hook up clips). Send large 2 stamp S.A.S.E. for complete and up-to-date photo list. Ron Boucher, 376 Cilley Rd., Manchester, NH 03103 (603) 669-1698

WANTED: Sylvania Model 3401 Portable Radio with Geiger Counter. Also, 2-Tube Superregen. Radio Kit made by Aurora Plastic Co. Both radios from late 1950's. Marc Koser, R.D. 2, Box 151-L, Cogan Sta., PA 17728

FOR SALE: Over 100 old Auto radios, most are tube types, $15.00 to $25.00 as is, or restored up to $100.00. List for SASE. James Fred, Cutler, IN 46920

FOR SALE: Three Spider Webb coils plus wooden coil mounting material to build yourself a Super Selective Uncle Joes Crystal set. Full instructions included. SASE to Joseph Horvath-W6GPB, 522 Third St., San Rafael, CA 94901

FOR SALE: I wish to sell my HALLICRAFTER SX-28 S/W receiver; could you steer me in the direction of an interested buyer? Neal Weissman, P.O. Box 202, Brooklyn, NY 11229

WANTED: Radiola Sr., Radiola Jr., driver coil for Radiola Horn U2 1320, WD-11 tubes. Scott Shanks, Rt. 3, Box 603, Sherwood, OR 97410 (503) 628-2909

WANTED: Radiola I, Spherical Audion, Vocarola speaker by Westinghouse Spark coils and transformers, Cash or Trade. Scott Shanks, Rt. 3, Box 603, Sherwood, OR 97140 (503) 628-2909

Radio Related tie clasps and lapel pins—al new list. Many new items now available. Put a picture of your favorite radio on a 2 1/4 inch plastic button. Send a LSASE for details and illustrated list. Mr. Michael Sabodish, Sr., 11-A Matawan Avenue, Cliffwood, NJ 07721

WANTED: Early RCA receivers, cathedreals, and parts for: Radiola V–metal covers & nameplate; Radiola–power transformer or power supply; Regenoflex–secondary coil, supports for sockets and lock; RCA Victor R35–complete chassis or parts; RCA UÛ-1320 and UZ-1325–drivers. Philco mantle clock/radio, cathedreals & parts for: Model 90–cathedral cabinet and power trans; Model 60–chassis and speaker; Model 37-620–dial scale; Misc. Philco knobs and 260 kcs. trans. Westinghouse RA parts: nameplate, var. condensers, coupler, vernier dial, or junk unit; DA parts: nameplate, sockets and transformers. Music Master 21" bell and gooseneck. J.S. Timmons, Philadelphia B eliminator, speakers, etc. Robert Husted, 270 N.W. 3rd Ct., Boca Raton, FL 33432.

WANTED: Old transmitting tubes for museum, amateur and commercial. Also, sockets, data sheets, manuals and related tube items. All correspondence answered. Ye Old Transmitting Tube Museum, P.O. Box 97, Crescent City, CA 95531 (707) 464-6470

FOR SALE: Historic items from the United Nations circa 1949; Wireless portable language translation receiver w/sub-miniature raytheon tubes, includes vintage style trimm hi-imp. headset with leather headband and rubber cushions $22. Western Electric 633A microphones used in the General Assembly & Security Consul $25–$45. Also, Scott Phantom deluxe & 800B. WANTED: Old broadcast mic's, studio equip., literature. 9" Dia. Philco dial for #37-690 or 38-690. Small screen & pre-war TV's, juke-boxes, W.E. equip., Quality console radios. Lid for Grebe Synchrophase, Tube Hi-Hi Equip. Robert Van Dyke, Squires Ave., East Quogue, NY 11942 (516) 728-1327

FOR SALE: 9 issues Radio Craft (11938–1941)–$20;; UV-203A in original box–$35; RCA slimline mike–$35. F.W. Chapman, Apt. B218, 1130 N Lake Parker Avenue, Lakeland, FL 33805

FOR SALE OR TRADE: Philco 90's, 70's, 37-665; Crosley repwoods, catalins, Zenith consoles, chrome deco sets, foreign sets. WANTED: Pre 1960 German & foreign sets, pilot radios, midwest radios, unusual cathedrals and many more. BIll Moore, 1005 Fieldstone Court, HSV, AL 35803 (205) 880-1207

WANTED: Information leading to acquisition of classic Western Electric microphone (looks like a small round radio speaker). Also info on crystal sets and early wireless gear. Jack Allison, 25 Elizabeth St., Farmingdale, NY 11735 (516) 420-8038

WANTED: G.E. R 80 Tombstone, Philco 90 cathedrea. Others in 1930–1937 range. David Bernardi, 112 Old Stone Bridge Road, Cos Cob, CT 06807

WANTED: Paragon A2 and DA2 amplifiers. Cash or trade on early items on hand. James McKinnon, 605 N. Bridge St., Bridgewater, New Jersey 08807

FOR SALE/TRADE: Stromberg Carlson (1939) Model 360, chassis with speaker & remotre volume/tuning-control, 3 bands, 13 tubes, tuning eye, working condition (see Rider V10, P 37) Gordon S. Creed, 6917 Western Ave. N.W., Washington, D.C. 20015 (202) 362-1707

SALE OR TRADE: Echophone, 3 tube, slant panel; Radio Broadcast mags 1927, 29 & 30 (6 copies) $15. Shure XTAL mike 70H (1936); 864 tubes in cartons, 6 for $45.00; Utah"Acorn" horn speaker; Murdock neck & base of horn speaker; 22" dia. Magnavox (bell only); Hickok 209A, 11" meter (VTVM). Floyd A Paul, 1545 Raymond Ave., Glendale, CA 91201 (818) 242-8961

WANTED: Almost anything Remler, especially the Infradynes, and models 43, 44, 72, 88 & 89, all-wave sets from the 30's. Cabinet for Philco 620. TRADE: A Western Electric 2-B Tuning Unit (preselector for early 20's WE receivers), for what-have-you. Rick Ferranti, 116 Franklin St., Arlington, MA 02174 (617) 646-6343

FOR SALE: Toning lacquer as used originally by Philco and others to get that dark finish is now available in spray cans. Van dyke Brown (for dark finish), Med. Walnut, or Cherry Brown–$5/can. Add for shipping. SASE for list of other shades and how to use. Vintage TV & Radio, 1204 Andres, Lakewood, OH 44107 (216) 226-4054

WANTED: Am anxious to get in touch with a former employee of the Hallicrafters Company who has some material to dispose of. He may be from New Jersey. Am still in need of early hallicrafter sets and related catalogues. Will mail descriptive list of items needed for this research project. Max C. DeHenseler, 333 East 43rd St., New York City, NY 10017

FOR SALE: Cathedrals and other AC radios, parts, tubes and novelty sets. Repair work done and rough estimates can be provided before you ship your radio. Send a large SASE for Stan's Surplus Stuff—cheap at half the price. Stan Lopes, 1201-74 Monument Blvd., Concord, CA 94520

WANTED: Power transformer for 23 tube Scott Imperial, or source to have rewound, generous cash or trade. Don Johnson, RR 1, Box 218-A, Windfall, IN 46076 (317) 945-7735

WANTED: McIntosh AE-2 preamp; 15wl, 50wl amplifiers. Also other early tube hi-fi equipment, magazines, etc. Jack Smith, 288 Winter Street, North Andover, MA 01845 (617) 686-7250

FOR SALE: Loads of parts and components for early radios. Send SASE for latest lists. Joseph Horvath, 522 Third St., San Rafael, CA 94901 (415) 454-2221. All prices FOB San Rafael, CA

SALE: Here is an opportunity for collectors—museums—to obtain a very early library of books, catalogues, magazines, and literature. A number of bound volumes available such as QST, Modern Electronics, and others as well as 1909 Navy call book, Dept. of Commerce publications. These will be sold individually or offers considered for the entire collection. Send SASE for complete list. Guy M. Martin, Jr., 812 Hunters Trail, Alendora, CA 91740 (818) 335-1566

FOR SALE: SCHEMATICS 1919/69; Radio Receivers, Phonographs, Automobile Radios, TV's. Include Brandname & Model No. Ask for our Book listings How to Repair Old Time Radios, 50 Years of Radio, Golden Age of Radio in the Home, Phonos, How to Tune the Secret Shortwave Spectrum,

How to become a HAM, Shortwave Listener's Handbook, plus many more. Send SASE to: SCARAMELLA, P.O. Box 1, Woonsocket, R.I. 02895-0001 USA

WANTED: A pair of good Freed Eisman audio transformers to complete a set being restored. Jerry Schoen, 1000 Rosehill Rd., Kawkauna, WI 54130

WANTED: Am looking for any DeForest parts to restore an Inter-panel. Dials and other internal parts. R. Rurick, 6 Whetstone Dr., #5, Gaithersburg, MD 20827

See our latest catalogue on parts—tubes—books now in stock. We aim to please the collectors and the catalogue is for FREE! W. 1st St., Tempe, AZ 85281

FOR SALE: 3 page list of Battery & AC radios. Send large SASE envelope. Donald Juleen, 6252 Ledge Rd., Sturgeon Bay, WI 54235 (414) 743-7922

WANTED: An 86 year old collector still fixing his old radio–needs two audio transformers any make. Will someone near Joliet, IL check this out? Please contact: Hugo Castelli, 1406 E. 5th Ave., Joliet, IL 60433

WANTED: Pre-war TV's-paying $1000 to $4000 CASH! 1940's post-wars $25–500. We have 225 TV's for sale-trade! Harry Poster, Box 1883, So. Hack., NJ 07606, (201) 794-9606. See you in Maryland.

WANTD: SILVER MARSHALL Round the Word Four; SILVER MARSHALL Advertising and Literature, McMurdo Silver Advertising and Literature. Larry Flegle, 210 Wylie Lane, Woodstock, GA 30188 (404) 928-3022

WANTED: I have a Page Six Radio made by R. B. Radio Co. of New York. Does anyone know of or remember this company?? Charles T. Mooney, 12309 Stafford Lane, Bowie, MD 20715

WANTED: Westinghouse Radiola RS, Aeriola 2 step amplifier, Clapp-Eastham Regen. receiver HR. Crosley 51-A amplifier, 51 Portable, PUP. Charles W. Rhodes, Journeys End Road., S. Salen, NY 10590

WANTED: Two dial light covers for RCA Radiola 17 & 18. Cash paid. Bill Grande, 2913 Rossiter Ave., Roslyn, PA 19001 (215) 659-5234

WANTED: Philco 90 cathedral, General Electric K-80, or RCA 140 (1934) Tombstone or any other cathedrals and tombstone radios. David Berardi, 112 Old Stone Bridge Rd. Cos Cob, CT 06807 (203) 869-4521

WANTED: A copy of "Volks-empfanger" by Dieter Holtschmidt. Also need a horn speaker driver for Murdock model 500—preferably ok, but open ok. John Pisarski, 114 Evans Road, Norristown, PA 19403 (215) 539-0756

FOR SALE: Rare Atwater Kent breadboard set in excellent shape—working order. Type 3725 with unusual controls and layout. Believe these were produced by prominent AK distributor near Minneapolis, Minnesota in early twenties. Make offer. F.A. Nichols, 1720 E. eldorado, Appleton, Wisconsin 54911

WESTINGHOUSE MICROPHONES OF THE 20S

In 1920, when the first Westinghouse radio station KDKA went on the air, the only microphones that were available were telephone transmitters. The type telephone in use at that time was the Western Electric "Candlestick" which used the #323 transmitter; a single button carbon unit. (See fig. 1.)

Figure 1

This telephone was used as it came from the manufacturer. The transmitter was wired through the receiver hang up assembly to the radio microphone circuit. By removing the receiver from the hanger and placing it on the desk, the microphone was "on;" and by placing it back into the hanger, the microphone was "off." This was convenient at the time. Later, the receiver and hanger were removed, and the on-off switch was on a remote control unit, or in some cases, replaced by a press to talk lever. In some instances, the hard rubber mouthpiece was replaced by a short (6") brass megaphone for better "distance" pickup.

The next step was to dispense with the telephone stand and use only the transmitter assembly. One of the first mics used at WJZ was a #323 Western Electric transmitter with the 6" brass megaphone, encased in a felt lined cylinder that had eye hooks, so that it could be suspended from an improvised stand. (See fig. 2.)

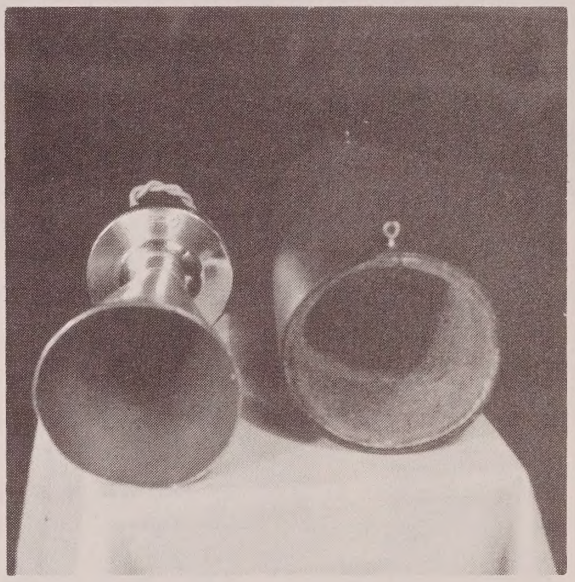

Figure 2

An approach to improved quality was to take two #323 transmitters and mount them back to back in a short brass cylinder to create a type of push-pull microphone. (See fig. 3.) The main problem with telephone transmitters was the heavy metal diaphragm producing large peaks in the frquency response. This was unacceptable for music so the Westinghouse engineers came up with a higher quality push-pull transmitter element. (Double button carbon microphone.) This consisted of a heavy paper diaphragm with a strip of gold leaf running across the center of each side. This paper diaphragm was held tightly around its perimeter by two

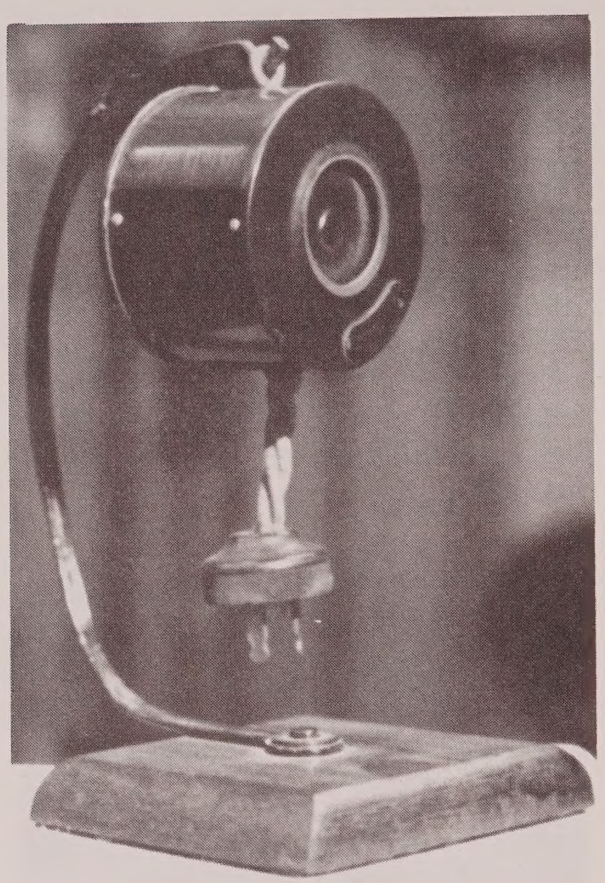

Figure 3

Bakelite rings bolted together. Across these rings on both sides were fastened brass bridges that held brass, carbon holding cups, that rested against the gold leaf on the diaphragms. This double button carbon microphone element was installed in a felt-lined brass cylinder that had a solid Bakelite back and a screened front. The cylinder also had an angle bracket with holes on top to facilitate suspending it from a stand or boom. The microphone wiring was terminated in three binding posts mounted across the bottom of the cylinder. (See fig. 4.) The same microphone was made to mount on a wood base with the binding posts mounted on the face of the wood base for desk use. (See fig. 5.) Due to the general appearance of these microphones and others to be described, the Westinghouse microphones in general were given the name "tomato cans."

The one major problem with carbon microphones was the constant hiss in the background. This was due to the current flowing through the loose carbon granules and could not be elimi-

Figure 4

nated. To get around this, the Westinghouse engineers were experimenting with dynamic and condenser microphones. They developed a microphone that later was to be referred to as the "dishpan" microphone. It was made by modifying a Phonetron loudspeaker. (An early cone type with a voice coil arrangement.) The speaker base was removed, a loop of wire was fastened under two of the upper screws to form a loop to suspend it from a bird cage

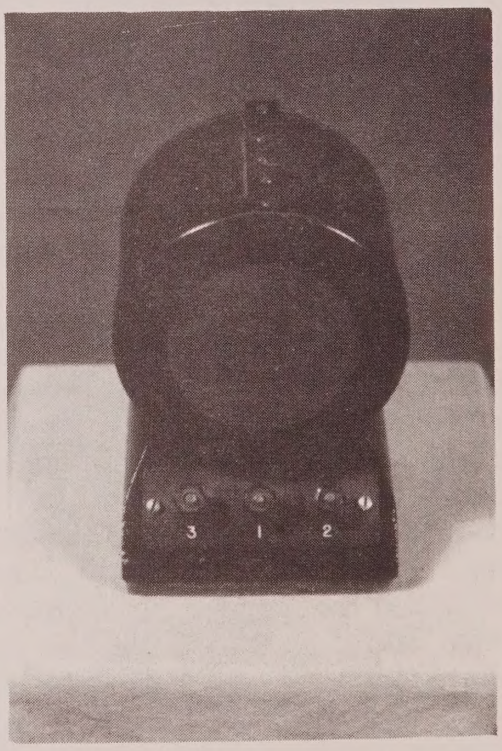

Figure 5

stand and a matching transformer was connected to match it to the equipment. (See fig. 6.) This microphone had good low and medium frequency response but fell off sharply on the high end. However, it did away with the hiss that you got with the carbons and that was a step in the right direction.

Figure 6

Westinghouse also developed and patented a dynamic microphone but it was too large and inefficient to be practical so they let it lie and put more effort into the condenser microphone. Their first condenser element was very similar to the early Western Electric element. It too was mounted in a short cylinder shaped housing similar to the double button carbon microphones. However, it required a power supply and a preamplifier so it was connected through a large diameter, high impedance cable to what was called the "coffin." The coffin was a low style cabinet that held the power supply and preamplifier. (See fig. 7.) Later, the preamplifier and microphone were built into a much smaller case that could be suspended or stand-mounted. This microphone required a five conductor shielded cable to carry the "A" and "B" power to it and the audio out to the control room. This in turn, facilitated the removal of the coffin from the studio. (See fig. 8.)

Figure 7

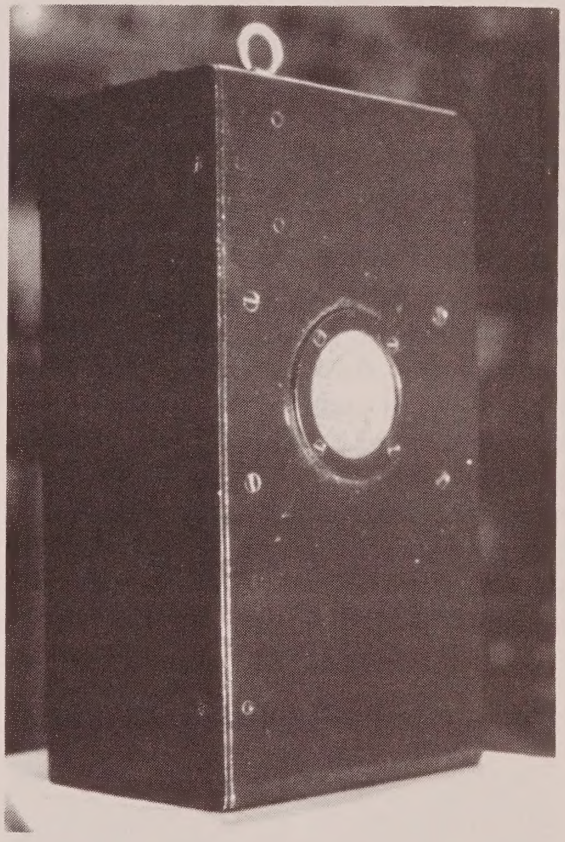

Figure 8

Another interesting microphone was the "Hushaphone." This was the same double button carbon microphone but in a sort of noise eliminating housing. (See fig. 9.)

This came about because of more people working in the studio when there were announcements to be made and unwanted noise in the background.

Westinghouse had also developed a

Figure 9

diaphragmless microphone known as the "Glo Discharge" microphone. This microphone looked very similar to the condenser microphone housing but much thinner. (See fig. 10.) It required a 3000V power supply and a preamplifier and consequently used a large cabinet to house the equipment and take up room in the studio. During 1923 this microphone received many glowing write ups in radio periodicals as the microphone of the future. It seemed to eliminate all the problems that were common to the diaphragm. But then it had many problems of its own and in a short time very little was heard of it and it seemed to fade away.

In 1926 Westinghouse had redesigned their double button carbon microphone and it looked more like the Western Electric type double button carbons in weight and size, but was made of brass rather than steel. (See fig. 11.) The microphone stand base for the newer double button carbon microphone and the Hushaphone microphone were the same bases used for a line of small fans Westinghouse manufactured for home use. Since Westinghouse was handmaking these microphones for their own little network of radio stations and not supplying them to others, they found it to be more practical to buy microphones from Western Electric and later from other suppliers. By the late twenties they were pretty much out of the microphone business.

Figure 10

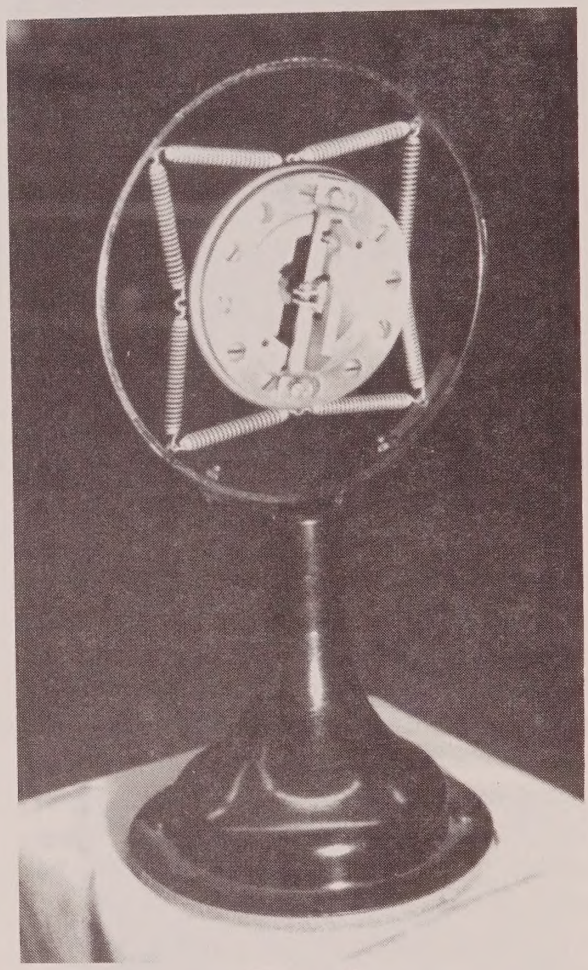

Figure 11

Bob Paquette
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Milw., Wis. 53208

★ CHICAGO ENGINEERING REVIEW

Engineering • Electricity • Drafting • Mechanics

SPRING ISSUE 1929

Published for the Students of the L. L. Cooke Schools